

117TH CONGRESS  
1ST SESSION

# S. 1065

To increase collaboration between offices within the Department of Energy to develop and deploy technology to assist the mission of the Office of Environmental Management.

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IN THE SENATE OF THE UNITED STATES

MARCH 25, 2021

Mrs. MURRAY (for herself and Mr. MANCHIN) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

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## A BILL

To increase collaboration between offices within the Department of Energy to develop and deploy technology to assist the mission of the Office of Environmental Management.

1       *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

3   **SECTION 1. SHORT TITLE.**

4       This Act may be cited as the “Environmental Management Liability Reduction and Technology Development Act of 2021”.

7   **SEC. 2. PURPOSE.**

8       The purpose of this Act is to establish programs—

- 1                         (1) to develop and deploy technologies in a  
2                         timely manner to better fulfill the mission of the Of-  
3                         fice of Environmental Management of the Depart-  
4                         ment of Energy;
- 5                         (2) to coordinate available technologies with re-  
6                         mediation projects to enable the start, and cost-effi-  
7                         cient and economical completion, of remediation  
8                         projects;
- 9                         (3) to establish a consistent process for tech-  
10                         nology development to achieve long-term solutions  
11                         rather than developing technologies to address 1  
12                         phase of a project at a time, which potentially in-  
13                         creases the long-term cleanup costs;
- 14                         (4) to reduce aggregate cost, better protect  
15                         workers, and complete the mission more effectively  
16                         and safely; and
- 17                         (5) to develop new technology and to train a  
18                         skilled workforce to enable the Secretary of Energy  
19                         to address the significant challenges the Department  
20                         faces.

21 **SEC. 3. DEFINITIONS.**

22                 In this Act:

- 23                         (1) COMPLEX.—The term “complex” means all  
24                         sites managed in whole or in part by the Office.

1                             (2) DEPARTMENT.—The term “Department”  
2 means the Department of Energy.

3                             (3) INSTITUTION OF HIGHER EDUCATION.—The  
4 term “institution of higher education” has the  
5 meaning given the term in section 101(a) of the  
6 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

7                             (4) MISSION.—The term “mission” means the  
8 mission of the Office.

9                             (5) NATIONAL LABORATORY.—The term “Na-  
10 tional Laboratory” has the meaning given the term  
11 in section 2 of the Energy Policy Act of 2005 (42  
12 U.S.C. 15801).

13                             (6) OFFICE.—The term “Office” means the Of-  
14 fice of Environmental Management of the Depart-  
15 ment.

16                             (7) SECRETARY.—The term “Secretary” means  
17 the Secretary of Energy, acting through the Assis-  
18 tant Secretary for Environmental Management.

19                             (8) SMALL BUSINESS CONCERN.—The term  
20 “small business concern” has the meaning given the  
21 term in section 3 of the Small Business Act (15  
22 U.S.C. 632).

23 **SEC. 4. INDEPENDENT ASSESSMENT AND MANAGEMENT.**

24                             (a) INDEPENDENT ASSESSMENT.—

1                             (1) IN GENERAL.—The Secretary shall obtain  
2 from the Corps of Engineers an independent assess-  
3 ment of the lifecycle costs and schedules of the  
4 cleanup programs of the Office.

5                             (2) FOCUS OF ASSESSMENT.—The assessment  
6 under paragraph (1) shall be focused on identifying  
7 key remaining technical risks and uncertainties of  
8 the cleanup programs.

9                             (3) USE OF ASSESSMENT.—The Office shall use  
10 the assessment under paragraph (1)—

11                                 (A) to reevaluate the major cleanup chal-  
12 lenes faced by the Office, including the  
13 timeline and costs associated with addressing  
14 those challenges with existing science and tech-  
15 nology investments;

16                                 (B) to make any adjustments to the  
17 science and technology development program of  
18 the Office that are necessary to address those  
19 major cleanup challenges;

20                                 (C) to evaluate potential savings from the  
21 development of new technologies over the life of  
22 the cleanup programs of the Office; and

23                                 (D) to provide recommendations to Con-  
24 gress with respect to the annual funding levels  
25 for the Incremental Technology Development

1           Program established under section 5(a), the  
2           High-Impact Technology Development Program  
3           established under section 6(a), and the Funda-  
4           mental Research Program established under  
5           section 7(a) that will ensure maximum cost-sav-  
6           ings over the life of the cleanup programs of  
7           the Office.

8           (4) NO EFFECT ON PROGRAM IMPLEMENTA-  
9           TION.—Nothing in this subsection affects the estab-  
10          lishment, implementation, or carrying out of any  
11          project or program under any other provision of law,  
12          including this Act, during the time period in which  
13          the assessment under paragraph (1) is carried out.

14          (b) MANAGEMENT PROCESS.—The Secretary shall  
15          design and implement a science and technology manage-  
16          ment process for identifying, prioritizing, selecting, devel-  
17          oping, and deploying the new knowledge and technologies  
18          needed to address the cleanup challenges faced by the Of-  
19          fice, including the technical risks and uncertainties identi-  
20          fied by the assessment under subsection (a).

21          (c) PEER REVIEW.—The Secretary shall use inde-  
22          pendent peer review to evaluate—

23           (1) the science and technology management  
24          process designed under subsection (b) before that  
25          process is implemented;

- 1                   (2) any science and technology projects before
- 2                   those projects are funded; and
- 3                   (3) the overall effectiveness and impact of the
- 4                   science and technology efforts of the Office.

## **5 SEC. 5. INCREMENTAL TECHNOLOGY DEVELOPMENT PROGRAM.**

7       (a) ESTABLISHMENT.—The Secretary shall establish  
8 a program, to be known as the “Incremental Technology  
9 Development Program” (referred to in this section as the  
10 “program”), to improve the efficiency and effectiveness of  
11 the cleanup processes of the Office.

## 12 (b) FOCUS.—

13                   (1) IN GENERAL.—The program shall focus on  
14                   the continuous improvement of new or available  
15                   technologies for—

(A) decontamination chemicals and techniques;

18 (B) remote sensing and wireless commu-  
19 nication to reduce manpower and laboratory ef-  
20 forts;

21 (C) detection, assay, and certification in-  
22 strumentation;

(D) packaging materials, methods, and shipping systems; and

(E) improving the overall efficiency and effectiveness of the Office.

7 (c) USE OF NEW AND EMERGING TECHNOLOGIES.—

8                             (1) IN GENERAL.—In carrying out the program,  
9                             the Secretary shall ensure that site offices of the Of-  
10                            fice conduct technology development and demonstra-  
11                            tion of new and emerging technologies to establish a  
12                            sound technical basis for the selection of tech-  
13                            nologies for cleanup or infrastructure operations.

**21 (d) GRANT PROGRAM.—**

22                   (1) IN GENERAL.—In carrying out the program,  
23                   the Secretary may provide to eligible entities grants  
24                   for technology development, demonstration, and de-

1 deployment projects to improve technologies in accord-  
2 ance with subsection (b).

3 (2) ELIGIBLE ENTITIES.—Entities eligible to  
4 receive a grant under the program include—

- 5 (A) the National Laboratories;  
6 (B) other Federal laboratories;  
7 (C) institutions of higher education;  
8 (D) contractors; and  
9 (E) small business concerns.

10 (3) SELECTION.—The Secretary shall select eli-  
11 gible entities for grants under the program through  
12 a rigorous process that involves—

- 13 (A) transparent and open competition; and  
14 (B) an independent peer review process de-  
15 scribed in paragraph (4).

16 (4) PEER REVIEW PROCESS.—

17 (A) IN GENERAL.—Each technology devel-  
18 opment, demonstration, and deployment project  
19 of an eligible entity under consideration for a  
20 grant under the program shall undergo an inde-  
21 pendent peer review process by a panel of not  
22 fewer than 3 peer reviewers selected in accord-  
23 ance with subparagraph (C), who shall evaluate  
24 the project in accordance with the criteria de-

1 scribed in subparagraph (B), with the goal of  
2 maximizing—

- 3 (i) returns on the research and devel-  
4 opment expenditures of the Office; and  
5 (ii) the return on investment of grant  
6 funds awarded under the program.

7 (B) CRITERIA.—The general criteria for  
8 peer review under subparagraph (A) shall in-  
9 clude, with respect to each project, including  
10 any technology to be developed, demonstrated,  
11 or deployed by the project, an evaluation of—

- 12 (i) mission relevancy;  
13 (ii) scientific and technical validity;  
14 (iii) ability to meet an existing mis-  
15 sion void;  
16 (iv) superiority to alternatives;  
17 (v) cost effectiveness;  
18 (vi) ability to reduce risk;  
19 (vii) regulatory acceptance;  
20 (viii) public acceptance; and  
21 (ix) likelihood of implementation.

22 (C) PEER REVIEWERS.—

- 23 (i) IN GENERAL.—A peer reviewer for  
24 a project under subparagraph (A) shall be  
25 selected—

(I) through a systematic approach to accessing peer reviewer information that ensures the appropriate range of expertise for the peer review panel; and

(II) from among—

(aa) contractors;

(bb) the National Labor-

(cc) other Federal Labora-

stories.

(dd) institutions of higher

## **education; and**

(ee) members of relevant  
organized associations

### (iii) MINIMIZATION OF DOE PARTICIPATION

TION.—To the maximum extent practicable, the peer reviewer selection process under clause (i) shall minimize the participation of staff of the Department as peer reviewers.

### (iii) MINIMIZATION OF CONFLICTS OF

INTEREST.—A peer reviewer selected under clause (i) to review the project may not be

1           affiliated with the eligible entity or the  
2           project being reviewed.

3           (D) REVIEW PROCESS.—Each panel of  
4           peer reviewers shall review the project—

5               (i) using a process of regular review  
6               and staged decision making that is com-  
7               parable to other peer review programs; and  
8               (ii) with rigorous attention to—

9                           (I) the collection of activity; and  
10                           (II) the achievement of perform-  
11                           ance metrics.

12           (5) COST-SHARING.—The Federal share of the  
13           costs of the development, demonstration, and deploy-  
14           ment of new technologies carried out using a grant  
15           under this subsection shall be not more than 70 per-  
16           cent.

17           (e) FUNDING.—There is authorized to be appro-  
18           priated to carry out the program—

19               (1) \$30,000,000 for each of fiscal years 2022  
20               through 2024; and

21               (2) \$50,000,000 for fiscal year 2025 and each  
22               fiscal year thereafter.

## 1 SEC. 6. HIGH-IMPACT TECHNOLOGY DEVELOPMENT PRO-

2                   **GRAM.**

3                 (a) ESTABLISHMENT.—The Secretary shall establish  
4 a program, to be known as the “High-Impact Technology  
5 Development Program” (referred to in this section as the  
6 “program”), under which the Secretary shall make grants  
7 to eligible entities for projects that pursue technologies  
8 that, with respect to the mission—

- 9                         (1) holistically address difficult challenges;  
10                        (2) hold the promise of breakthrough improve-  
11                       ments; or  
12                       (3) align existing or in-use technologies with  
13                       difficult challenges.

14                 (b) WORKSHOP.—The Secretary shall commence the  
15 program with a workshop to identify, with respect to the  
16 technologies developed pursuant to the program—

- 17                         (1) the challenges that need to be addressed;  
18                       and

- 19                         (2) how—  
20                                 (A) to maximize the impact of existing re-  
21                               sources of the Office; and  
22                                 (B) to ensure that the technology develop-  
23                               ment targets challenges across the complex.

24                 (c) AREAS OF FOCUS.—Areas of focus of a project  
25 receiving a grant under this section may include—

1                   (1) developing and demonstrating improved  
2       methods for source and plume characterization and  
3       monitoring, with an emphasis on—

4                   (A) real-time field acquisition; and  
5                   (B) the use of indicator species analyses  
6       with advanced contaminant transport models to  
7       enable better understanding of contaminant mi-  
8       gration;

9                   (2) developing and determining the limits of  
10      performance for remediation technologies and inte-  
11      grated remedial systems that prevent migration of  
12      contaminants, including by producing associated  
13      guidance and design manuals for technologies that  
14      could be widely used across the complex;

15                  (3) demonstrating advanced monitoring ap-  
16      proaches that use multiple lines of evidence for mon-  
17      itoring long-term performance of—

18                  (A) remediation systems; and  
19                  (B) noninvasive near-field monitoring tech-  
20      niques;

21                  (4) developing and demonstrating methods to  
22      characterize the physical and chemical attributes of  
23      waste that control behavior, with an emphasis on—

24                  (A) rapid and nondestructive examination  
25      and assay techniques; and

(B) methods to determine radio-nuclide, heavy metals, and organic constituents;

3                   (5) demonstrating the technical basis for deter-  
4                  mining when enhanced or natural attenuation is an  
5                  appropriate approach for remediation of complex  
6                  sites;

7                             (6) developing and demonstrating innovative  
8                             methods to achieve real-time and, if practicable, in  
9                             situ characterization data for tank waste and proc-  
10                          ess streams that could be useful for all phases of the  
11                          waste management program, including improving  
12                          characterization of residual waste in tanks;

13                   (7) adapting existing treatment technologies or  
14                   demonstrating new treatment technologies at the  
15                   pilot plant scale using real wastes or realistic surro-  
16                   gates—

17 (A) to address engineering adaptations;  
18 and

19 (B) to enable successful deployment at full-  
20 scale and in support of operations;

(8) developing and demonstrating rapid testing protocols that—

(A) are accepted by the Environmental Protection Agency, the Nuclear Regulatory

1           Commission, the Department, and the scientific  
2           community;

3           (B) can be used to measure long-term  
4           waste form performance under realistic disposal  
5           environments;

6           (C) can determine whether a stabilized  
7           waste is suitable for disposal; and

8           (D) reduce the need for extensive, time-  
9           consuming, and costly analyses on every batch  
10          of waste prior to disposal;

11          (9) developing and demonstrating direct sta-  
12          bilization technologies to provide waste forms for  
13          disposing of elemental mercury; and

14          (10) developing and demonstrating innovative  
15          and effective retrieval methods for removal of resid-  
16          ual materials from tanks and connecting pipelines.

17          (d) PROJECT SELECTION.—

18           (1) ELIGIBLE ENTITIES.—Entities eligible to  
19          receive a grant under the program include—

20           (A) the National Laboratories;

21           (B) other Federal laboratories;

22           (C) institutions of higher education;

23           (D) contractors; and

24           (E) small business concerns.

1                         (2) SELECTION.—The Secretary shall select eligible entities for grants under the program through  
2                         a rigorous process that involves—  
3

4                             (A) transparent and open competition; and  
5                             (B) an independent peer review process described in paragraph (3).  
6

7                         (3) PEER REVIEW PROCESS.—  
8

9                             (A) IN GENERAL.—Each project of an eligible entity under consideration for a grant  
10                          under the program shall undergo an independent peer review process by a panel of not  
11                          fewer than 3 peer reviewers selected in accordance with subparagraph (B).  
12

13                             (B) PEER REVIEWERS.—  
14

15                                 (i) IN GENERAL.—A peer reviewer for  
16                          a project under subparagraph (A) shall be  
17                          selected—  
18

19                                     (I) through a systematic approach to accessing peer reviewer information that ensures the appropriate range of expertise for the peer  
20                          review panel; and  
21

22                                     (II) from—  
23

24                                     (aa) a relevant database,  
25                          such as a database of chemical

1                   engineers, geologists, physicists,  
2                   materials scientists, or biologists;  
3                   or

4                   (bb) among members of rel-  
5                   evant professional societies.

6                   (ii) MINIMIZATION OF DOE PARTICIPA-  
7                   TION.—To the maximum extent prac-  
8                   ticable, the peer reviewer selection process  
9                   under clause (i) shall minimize the partici-  
10                  pation of staff of the Department as peer  
11                  reviewers.

12                  (iii) MINIMIZATION OF CONFLICTS OF  
13                  INTEREST.—A peer reviewer selected under  
14                  clause (i) to review the project may not be  
15                  affiliated with the eligible entity or the  
16                  project being reviewed.

17                  (C) REVIEW PROCESS.—Each panel of  
18                  peer reviewers shall review the project—

19                   (i) using a process of regular review  
20                  and staged decision making that is com-  
21                  parable to other peer review programs; and

22                   (ii) with rigorous attention to—

23                   (I) the collection of activity; and  
24                   (II) the achievement of perform-  
25                  ance metrics.

1       (e) FUNDING.—There is authorized to be appro-  
2 priated to carry out the program \$150,000,000 for fiscal  
3 year 2022 and each fiscal year thereafter.

4 **SEC. 7. FUNDAMENTAL RESEARCH PROGRAM.**

5       (a) ESTABLISHMENT.—The Director of the Office of  
6 Science (referred to in this section as the “Director”) shall  
7 establish a program, to be known as the “Fundamental  
8 Research Program” (referred to in this section as the  
9 “program”), under which the Director shall make grants  
10 to eligible entities for projects focused on developing new  
11 knowledge and capabilities that are associated with the  
12 challenges of the mission.

13       (b) ADMINISTRATION.—The Director shall—

14           (1) manage the program in close coordination  
15 with the Assistant Secretary of Energy for Environ-  
16 mental Management;

17           (2) specifically tailor the program to the mis-  
18 sion; and

19           (3) align the program with long-term, 5- to 10-  
20 year site milestones agreed to by Federal regulators  
21 and the States, so that the science developed pursu-  
22 ant to the program can—

23           (A) progress effectively; and

(B) provide the understanding necessary to develop solutions that align with the site timelines.

4 (c) AREAS OF FOCUS.—Areas of focus of a project  
5 receiving a grant under this section may include research  
6 on—

(1) the atomic- and molecular-scale chemistries  
of waste processing;

(2) contaminant immobilization in engineered  
and natural systems;

11 (3) developing innovative materials, with an em-  
12 phasis on nanomaterials or biomaterials, that could  
13 enable sequestration of challenging hazardous or ra-  
14 dioactive constituents such as technetium and iodine;

(4) elucidating and exploiting complex speciation and reactivity far from equilibrium;

17 (5) understanding and controlling chemical and  
18 physical processes at interfaces;

(6) harnessing physical and chemical processes  
to revolutionize separations;

(7) tailoring waste forms for contaminants in  
harsh chemical environments; or

(8) predicting and understanding subsurface system behavior and response to perturbations.

**25 (d) PROGRAM REQUIREMENTS.—**

1                             (1) ELIGIBLE ENTITIES.—Entities eligible to  
2 receive a grant under the program include—

- 3                                 (A) the National Laboratories;  
4                                 (B) other Federal laboratories;  
5                                 (C) institutions of higher education;  
6                                 (D) contractors; and  
7                                 (E) small business concerns.

8                             (2) SELECTION.—The Secretary shall select eligible entities for grants under the program through  
9 a rigorous process that involves—

- 10                                 (A) transparent and open competition; and  
11                                 (B) an independent peer review process described in paragraph (3).

12                             (3) PEER REVIEW PROCESS.—

13                                 (A) IN GENERAL.—Each project of an eligible entity under consideration for a grant under the program shall undergo an independent peer review process by a panel of not fewer than 3 peer reviewers selected in accordance with subparagraph (B).

14                                 (B) PEER REVIEWERS.—

15                                 (i) IN GENERAL.—A peer reviewer for a project under subparagraph (A) shall be selected—

6 (II) from—

7 (aa) a relevant database,  
8 such as a database of chemical  
9 engineers, geologists, physicists,  
10 materials scientists, or biologists;

11 or

12 (bb) among members of relevant professional societies  
13

(C) REVIEW PROCESS.—Each panel of peer reviewers shall review the project—

<sup>6</sup> (ii) with rigorous attention to—

7 (I) the collection of activity; and  
8 (II) the achievement of perform-  
9 ance metrics.

10       (e) FUNDING.—There is authorized to be appro-  
11 priated to carry out the program \$30,000,000 for fiscal  
12 year 2022 and each fiscal year thereafter.

## **13 SEC. 8. ENVIRONMENTAL MANAGEMENT UNIVERSITY PRO- 14 GRAM.**

15       (a) ESTABLISHMENT.—The Secretary shall establish  
16 a program, to be known as the “Environmental Manage-  
17 ment University Program” (referred to in this section as  
18 the “program”—

- 1                             (A) a source of new ideas; and  
2                             (B) access to advances in engineering and  
3                             science;  
4                             (3) to clearly identify to institutions of higher  
5                             education the tools necessary to enter into the envi-  
6                             ronmental management field professionally; and  
7                             (4) to encourage current employees of the De-  
8                             partment to pursue advanced degrees.
- 9                             (b) AREAS OF FOCUS.—Areas of focus of a project  
10 receiving a grant under this section may include—  
11                             (1) the atomic- and molecular-scale chemistries  
12                             of waste processing;  
13                             (2) contaminant immobilization in engineered  
14                             and natural systems;  
15                             (3) developing innovative materials, with an em-  
16                             phasis on nanomaterials or biomaterials, that could  
17                             enable sequestration of challenging hazardous or ra-  
18                             dioactive constituents such as technetium and iodine;  
19                             (4) elucidating and exploiting complex specia-  
20                             tion and reactivity far from equilibrium;  
21                             (5) understanding and controlling chemical and  
22                             physical processes at interfaces;  
23                             (6) harnessing physical and chemical processes  
24                             to revolutionize separations;

1                   (7) tailoring waste forms for contaminants in  
2                   harsh chemical environments; or

3                   (8) predicting and understanding subsurface  
4                   system behavior and response to perturbations.

5                 (c) INDIVIDUAL RESEARCH GRANTS.—In carrying  
6 out the program, the Secretary may make individual re-  
7 search grants, in the amount of not less than \$150,000  
8 but not more than \$300,000 per year, to faculty, post-  
9 doctoral fellows or researchers, and graduate students of  
10 institutions of higher education for 3-year research  
11 projects, with an option for an extension of 1 additional  
12 period of 2 years.

13                 (d) GRANTS FOR INTERDISCIPLINARY COLLABORA-  
14 TIONS.—In carrying out the program, the Secretary may  
15 make research grants, in the amount of not more than  
16 \$400,000 per year for each grant, for strategic partner-  
17 ships among scientists, faculty, post-doctoral fellows or re-  
18 searchers, and graduate students of institutions of higher  
19 education for 3-year research projects.

20                 (e) HIRING OF UNDERGRADUATES.—In carrying out  
21 the program, the Secretary may establish a summer in-  
22 ternship program for undergraduates of institutions of  
23 higher education to work on projects relating to environ-  
24 mental management.

1       (f) WORKSHOPS.—In carrying out the program, the  
2 Secretary may hold workshops with the Office of Environ-  
3 mental Management, the Office of Science, and members  
4 of academia and industry concerning environmental man-  
5 agement challenges and solutions.

6       (g) FUNDING.—There is authorized to be appro-  
7 priated to carry out the program \$7,000,000 for fiscal  
8 year 2022 and each fiscal year thereafter.

